

Amendments to the Claims

This listing of claims will replace all prior listings of claims in the application.

Listing of Claims

1.-9. (Canceled)

10. (Currently Amended) The clamping device for the article to be heat treated according to ~~claim 9~~claim 26, wherein said first clamping means is an automatic clamping means controlled by a control device, and an order for clamping said article to be heat treated by said first clamping means is controlled by said control device, and the order for clamping is earlier than all said second clamping means.

11. (Currently Amended) The clamping device for the article to be heat treated according to ~~claim 8~~claim 26, wherein the side to which said quenching is performed is one side out of inside and outside of said raised portion, and said plural clamping means apply a load for pressing and displacing said raised portion base ends on both sides across the width in said raised portion to said one side out of inside and outside of said raised portion, to said article to be heat treated.

12.-15. (Canceled)

16. (Currently Amended) The clamping device for the article to be heat treated according to ~~claim 15~~claim 27, wherein the placement of said article to be heat treated on said lower clamping means is performed while said lower clamping means is on the way of being raised by said raising and lowering member.

17. (Previously Presented) The clamping device for the article to be heat treated according to claim 16, wherein a rail for guiding a traveling body on which said article to be heat treated is placed is installed at the middle of the height position where said lower clamping member is raised by said raising and lowering member, and said article to be heat treated is transferred from said traveling body to said lower clamping member while said lower clamping member is on the way of being raised by said raising and lowering member.

18. (Currently Amended) The clamping device for the article to be heat treated according to ~~claim 15~~claim 27, wherein the placement of said article to be heat treated on said lower clamping means is performed before the lower clamping member begins to be raised by said raising and lowering member.

19. (Previously Presented) The clamping device for the article to be heat treated according to claim 18, wherein said raising and lowering member is arranged on a traveling body traveling just below said upper clamping member.

20. (Canceled)

21. (Previously Presented) A method of clamping an article to be heat treated, made of a sheet material and having an elongated shape, constituted such that at least one heat-treated region to be heat treated by quenching after heating and at least one non heat-treated region not to be heat treated are both defined to extend in a longitudinal direction, and said heat-treated region and said non heat-treated region are provided side by side in a width direction orthogonal to the longitudinal direction, having a three-dimensional shape in which a raised portion is provided in the width direction orthogonal to the longitudinal direction,

raised in the direction orthogonal to the longitudinal direction and the width direction as well as extending in the longitudinal direction, and including two flange portions extending outward in the width direction from raised portion base ends on both sides across the width in said raised portion, in which at least one portion of said raised portion is said heat-treated region, said method of clamping an article to be heat treated comprising:

a first step of clamping said article to be heat treated by said first clamping means as being a tight clamping means holding fixedly said non heat-treated region between a first clamping means and a second clamping means arranged in plural in the longitudinal direction;

a second step of clamping said article to be heat treated by said plural second clamping means as being loose clamping means allowing said article to be heat treated to be convex on the side of said heat-treated region, in which an order for the clamping is in an order from near said first clamping means;

a third step of heating said heat-treated region; and

a fourth step of performing a quenching to said article to be heat treated curved to be convex on one side in the direction orthogonal to the longitudinal direction and the width direction by a load given from said first clamping means and said plural second clamping means, quenching from the other side.

22.-25. (Canceled)

26. (New) A clamping device for clamping an elongated-shaped article having a region to be heat-treated in a fixed position, the elongated article being made of a sheet material having a three-dimensional shape in which a raised portion is raised in a direction orthogonal to the longitudinal direction and the width direction of the article, as well as extending in the longitudinal direction, and comprising two flange

portions extending outwardly in the width direction from a raised portion base ends on both sides across the width of the article in the raised portion, in which at least one portion of said raised portion is said heat-treated region, at least one heat-treated region of the article to be heat-treated by quenching after heating and at least one non heat-treated region of the article not to be heat-treated both extend in the longitudinal direction of the article, the heat-treated region and the non heat-treated region being provided side-by-side in a width direction of the article orthogonal to the longitudinal direction, the article being clamped at a non heat-treated region during heat treatment, the clamping device comprising:

a plurality of clamping means arranged along the longitudinal direction of the article at each of the two flange portions, which are non heat-treated regions, at least one of the plurality of clamping means including a loose clamping means provided nearest to an end of the article in the longitudinal direction among said plurality of clamping means, said plurality of clamping means applying a load for allowing said article to be heat treated to be convex on one side in the direction orthogonal to the longitudinal direction and the width direction to said non heat-treated region, said plurality of clamping means comprising a first clamping means and a second clamping means arranged in the longitudinal direction of said article to be heat treated,

wherein the number of said first clamping means is one for the longitudinal direction of said article to be heat treated, and said first clamping means is a tight clamping means holding fixedly a non heat-treated region, whereas the number of said second clamping means arranged apart from said first clamping means along the longitudinal direction is plural in the longitudinal direction of said article to be heat treated, and said second clamping means are loose clamping means and automatic clamping means controlled by a control device,

wherein an order for clamping said article to be heat treated by these second clamping means is controlled by said control device, and the order of clamping is in an order from near said first clamping means, and

wherein said quenching for said heat treatment operation is performed from the other side in the direction orthogonal to the longitudinal direction and the width direction.

27. (New) In a clamping device for clamping an elongated-shaped article to be heat-treated in a fixed position, in which at least one heat-treated region of the article to be heat-treated by quenching after heating and at least one non heat-treated region of the article not to be heat-treated both extend in a longitudinal direction of the article, the heat-treated region and the non heat-treated region are provided side-by-side in a width direction of the article orthogonal to the longitudinal direction, and the article being clamped at a non heat-treated region during heat treatment, the improvement comprising the clamping device comprising:

a plurality of clamping means arranged along the longitudinal direction of the article, at least one of the plurality of clamping means including a loose clamping means provided nearest to an end of the article in the longitudinal direction among said plurality of clamping means and at least one of the plurality of clamping means being constituted by an upper clamping member and a lower clamping member arranged vertically to face each other, at least one member of the upper clamping member and the lower clamping member being arranged on a raising and lowering member for raising and lowering the at least one member,

wherein said lower clamping member is arranged on said raising and lowering member, said article to be heat treated is placed on said lower clamping means, and said article to be heat treated is clamped by said upper clamping member and said

lower clamping member with said lower clamping member raised by said raising and lowering member.

28. (New) In a clamping device for clamping an elongated-shaped article to be heat-treated in a fixed position, in which at least one heat-treated region of the article to be heat-treated by quenching after heating and at least one non heat-treated region of the article not to be heat-treated both extend in a longitudinal direction of the article, the heat-treated region and the non heat-treated region are provided side-by-side in a width direction of the article orthogonal to the longitudinal direction, and the article being clamped at a non heat-treated region during heat treatment, the improvement comprising the clamping device comprising:

a plurality of clamping means arranged along the longitudinal direction of the article, at least one of the plurality of clamping means including a loose clamping means provided nearest to an end of the article in the longitudinal direction among said plurality of clamping means and at least one of the plurality of clamping means being constituted by an upper clamping member and a lower clamping member arranged vertically to face each other, at least one member of the upper clamping member and the lower clamping member being arranged on a raising and lowering member for raising and lowering the at least one member,

wherein said lower clamping member is arranged on said raising and lowering member, and said upper clamping member is arranged on an immovable member to which a heating device for heating said heat-treated region of said article to be heat treated is installed.

29. (New) In a clamping device for clamping an elongated-shaped article to be heat-treated in a fixed position, in which at least one heat-treated region of the article to be heat-treated by quenching after heating and at

least one non heat-treated region of the article not to be heat-treated both extend in a longitudinal direction of the article, the heat-treated region and the non heat-treated region are provided side-by-side in a width direction of the article orthogonal to the longitudinal direction, and the article being clamped at a non heat-treated region during heat treatment, the improvement comprising the clamping device comprising:

a plurality of clamping means arranged along the longitudinal direction of the article, at least one of the plurality of clamping means including a loose clamping means provided nearest to an end of the article in the longitudinal direction among said plurality of clamping means, said loose clamping means comprising a movement smoothing means for smoothing the movement of said non heat-treated region of the article in the longitudinal direction and allowing the article to be convex on the side of said heat-treated region,

wherein each of said plurality of clamping means is constituted by including an upper clamping member and a lower clamping member arranged to face each other vertically and said upper clamping member and said lower clamping member are disposed on a work table to which said article to be heat treated is set.